PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Soft Floor Coverings

We, MONSANTO TEXTILES LIMITED, formerly known as CHEMSTRAND LIMITED, a British Company of Monsanto House, 10-18 Victoria Street, London, S.W.1., do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to durable soft floor coverings and to a method for producing same.

Soft floor coverings have enjoyed greatly increased popularity in recent years due to their greater warmth and comfort than hard floor coverings and the increased utility and durability afforded by synthetic fibres. Presently soft floor coverings are of the pile fabric type and are generally produced by weaving or tufting selected pile yarns on to a backing or base fabric, or of the non-pile type exemplified by woven grass, fibre, paper and reeds which though durable are generally harsher and less comfortable than the pile types of soft floor coverings. Consequently there has long been a need for a durable low cost soft floor covering offering comfort and warmth as well as the long wearing qualities of the non-pile types.

The present invention provides a soft floor covering which is highly durable and resistant to abrasion and which affords a soft and comfortable footing and further provides a process for producing such a durable soft floor covering.

The invention comprises a soft floor covering comprising a stabilised double jersey fabric bonded to a resilient polymeric backing of high compression modulus.

The soft floor coverings of the invention employ knitted rather than woven fabrics since such fabrics have been found to afford greater resilience with increased durability and abrasion resistance. The preferred fabrics are double jersey blister fabrics since these afford surface texture and pattern as well as durability. The yarns can consist of either continuous filament or spun staple yarns, textured or untextured, and of synthetic, cellulosic or natural composition. For example the yarns may be composed of continuous filament nylon, polyester, acrylic, polyolefin, rayon or cellulose acetate or spun staple fibres of any of the above as well as natural fibres such as cotton and wool. A preferred yarn is a continuous filament textured nylon, polyester or acrylic yarn.

The knitting machine used to produce the double jersey fabrics can be of any gauge. Yarns of suitable count for use with the gauge of the machine chosen should be employed. It is preferred to use a relatively fine gauge machine with relatively heavy yarn in order that a tightly knitted snag resistant construction can be produced.

The knitted fabrics are bonded to a resilient polymeric backing of high compression modulus. A backing of high compression modulus is one that, in a sheet 3/16 inch in height requires a surface loading of not less than 3 pounds per square inch to compress it to 50% of its original height. Such backings can consist of foams of synthetic or natural rubber, polyurethanes, polyacrylics, polyesters or polyvinyl chloride. Alternatively, such backings can comprise embossed backings of any of the above substances, either foamed or unfoamed, together with an additional resilient polymeric substance of the same or different type, preferably foamed. The bonding can be accomplished by any suitable procedure employing flame bonding, adhesives or the adhesive properties of uncured foamed materials. Bonding of the resilient backing can be carried out on the usual equipment

employed for depositing foamed polymeric materials.

The fabric is stabilized dimensionally, that is to say it is rendered substantially inextensible in the plane of the fabric so as to reduce the tendency of the fabric to creep or move when subjected to traffic and wear. This can be accomplished by stabilizing the fabric by means of a heating treatment or treatment with stabilizing solutions or resins so as to form a coherent film on a surface of the fabric. It may also be accomplished by initially bonding the fabric to a scrim or other fabric prior to bonding the laminate to a resilient polymeric backing. Alternatively, the scrim or stabilizing fabric can be included within the resilient polymeric layer by foaming the resilient polymeric material about and through the stabilizing fabric as it is bonded to the knitted face fabric. In an alternative stabilizing treatment a minimum of 12 ounces per square yard of an acrylic resin is applied to the back of the fabric prior to applying and foaming the resilient polymeric material.

The soft floor coverings of this invention are attractive, comfortable, demonstrate good durability, excellent abrasion resistance and fire resistance as well as being economical in production and use. They require no separate underlay since they have incorporated a resilient backing. They are easily and economically laid and cleaned and retain their excellent appearance through long and hard use.

The invention is further illustrated by the following Example.

EXAMPLE

A double knit blister fabric in nylon yarn was produced for use as the face fabric. This fabric was knitted from a doubled 100 denier, 34 filament false twist textured nylon on an 18 gauge jacquard double jersey machine to produce a tightly knit textured fabric. The griege fabric was thereafter scoured in the usual hot solution to remove existing producer finish and was then dyed with a mixture of four acid dyestuffs to produce a brown gold shade. After rinsing off the remaining traces of dyestuff the fabric was hydroextracted, dried fully relaxed and rolled up. The fabric so treated had been reduced in total width from 66 inches in the griege to a finished width of 56 inches and a very tightly knitted textured blister fabric was produced.

To the nylon face fabric produced above there was first applied a stabilizing hessian backing by coating the fabric with latex emulsion and nipping the stabilizing hessian together with it prior to passing both through a dryer. Thereafter the laminated stabilized fabric was passed through a foaming unit which applied an aerated foamed latex to a thickness of ¼" which was bonded and cured at 140°C. There was thus produced a bonded durable soft floor covering possessing a stabilized knitted nylon face fabric bonded to a foamed polymeric compression backing material.

Various tests for abrasion resistance, fire resistance, recovery from dynamic and static loading and cleaning after actual wear testing were performed with the above floor covering sample. A sample cut from the above bonded floor covering was subjected to testing on a W.I.R.A. carpet abrasion machine with a total load of 8½ lbs. for 30,500 revolutions prior to stopping the test. The end point of the test is reached when a noticeable change between the original and the test sample is observed and this number of revolutions is considered a highly satisfactory result. Another sample was subjected to test on the Martindale abrasion tester with a total load of 28 ounces. Although the sample appeared somewhat duller after the first 10,000 revolutions the test was not stopped until 100,000 revolutions had been passed and the results were considered quite satisfactory. Thus it is seen that the knitted stabilized face fabric when properly bonded produces a soft floor covering material of very high abrasion and wear resistance.

A sample of the floor covering was subjected to a burning test for flame propagation. The test consisted of striking and dropping 10 separate book matches on to the surface of the sample and measuring the area burned about the head of the matches after they have burned out. If the only area affected is that immediately beneath the head of the match it is concluded that the material does not propagate an open flame and the material may be deemed fire resistant. In this test no propagation of flame from any of the matches took place and the floor covering is therefore deemed fire resistant.

Samples of the floor covering were subjected to both dynamic and static loading test to determine the percentage loss in height or thickness as a result of such loading. In the dynamic loading test the sample was tested on a W.I.R.A. dynamic loading machine with a head load of 2.8 lbs. and a speed of 14 impacts a minute and the repeat cycle of 25 impacts. The total load area subjected to the test is 0.8 sq. in. Results are set forth in Table 1 below:—

TABLE 1

Dynamic Loading (Impacts)	*Loss of Height* (Percentage)
50	1.5
100	1.7
200	2.0
500	2.3
1,000	3.6
After 24 hrs. recovery	1.5

The static loading test consisted of subjecting a sample of the soft floor covering to a static load of 100 lbs. for 24 hours in a load area of 1" diameter and then measuring the percentage loss of height or thickness. The results of the static loading test are set out below in Table II:—

TABLE II

Time after Load Removal	*Loss of Height* (Percentage)
Immediately	12.2
1 hour	6.4
3 hours	3.8
7 hours	3.2
24 hours	2.0

Samples of the soft floor covering were submitted to actual wear test by being laid in a hallway area of heavy foot traffic for a period of six weeks. Two samples, one of which was treated with a silicone anti-soiling compound and the other untreated were positioned in this hallway and subjected to foot traffic for the six week period. At the end of this period both samples were first cleaned by a vacuum cleaner and then shampooed with a standard carpet cleaning shampoo and observed after each procedure was completed. After vacuum cleaning both samples were virtually returned to their original condition other than for stains caused by spilled liquids. After shampooing both samples showed the same colour and appearance as the original untreated samples since the shampooing removed the liquid stains as well as the silicone anti-soil which had been applied to one sample. Inspection of the wear tested samples when directly compared with the original samples showed that virtually no wear had taken place in the period of six weeks of the face fabric once they had been thoroughly cleaned. There was no gross evidence of abrasion of the surface fabric nor had there been any change in the colour of such fabric as a result of the extended wear trial.

Many uses for the durable soft floor coverings of this invention are apparent. Among these are aircraft carpeting, automobile carpeting, contract carpeting for public buildings with heavy traffic such as hotels, libraries, schools and the like, carpeting for gymnasiums and sports areas and carpeting in private homes. It will also be appreciated that soft coverings of the same construction with either thinner or thicker foamed backing materials would be quite suitable for use as upholstering materials for conventional furniture, for bonding to moulded furniture or for bonding to pressed steel furnature to afford softer and more confortable contoured seating. It will likewise be apparent that similar bonded covering materials of high durability and abrasion resistance would be most suitable for use in upholstering the interior of automobiles in addition to carpeting the floors thereof. Other suitable uses will readily occur to those skilled in the textile art.

WHAT WE CLAIM IS:

1. A soft floor covering comprising a stabilized double jersey fabric bonded to a resilient polymeric backing of high compression modulus.

2. A floor covering according to Claim 1, in which the resilient polymeric backing is a foam of natural or synthetic rubber.

3. A floor covering according to either of Claims 1 and 2, in which the fabric is a double jersey blister fabric.

4. A floor covering according to any of Claims 1 to 3, in which the fabric is knitted from a continuous filament textured nylon yarn.

5. A floor covering according to any of Claims 1 to 4, in which the fabric has a tightly knitted snag-resistant construction.

6. A floor covering according to any of Claims 1 to 5, in which the fabric is stabilized by having bonded to it a scrim or other fabric.

7. A floor covering according to any of Claims 1 to 5, in which the fabric is one that has been stabilized by application of a resin.

8. A floor covering according to Claim 7, in which the fabric is one that has been stabilized by application of a minimum of 12 ounces per square yard of an acrylic resin.

9. A process for the production of a soft floor covering, in which a stabilized double jersey fabric is bonded to a resilient polymeric backing of high compression modulus.

10. A process according to Claim 9, in which the bonding is accomplished by adhesives or by the adhesive properties of uncured foamed materials.

11. A process according to either of Claims 9 and 10 for making a soft floor covering according to any of Claims 1 to 7.

12. A process according to either of Claims 9 and 10 for making a soft floor covering according to Claim 8.

13. A process for the production of a soft floor covering substantially as described in the Example.

14. A soft floor covering produced by a process according to any of Claims 9 to 11 and 13.

15. A soft floor covering produced by a process according to Claim 12.

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